Region 3 Local Limits Spreadsheet

Version 5.1

User's Manual

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1.0 INTRODUCTION

The Region 3 Local Limits Spreadsheet is designed as a tool to help in the calculation and/or reevaluation of local limits under the pretreatment program. The spreadsheet was developed in Microsoft Excel since Excel appears to be the most common spreadsheet software in use by POTWs and other people involved in local limits development. Guidance provided in this instruction manual is based on Excel 2013. Other versions of Excel should have similar features, but the steps needed to accomplish some of the things discussed in this manual may be slightly different for other versions of Excel.

In general, the spreadsheet is designed to follow the local limits development procedure used in EPA's local limits guidance[1], although there are a few areas where a Regional approach is also incorporated into the spreadsheet. These areas are generally discussed in this manual. This manual is not intended to include guidance on the local limits development process, or on the "right" values to enter in any of the given cells of the spreadsheet. For guidance on developing local limits, the user is directed to EPA's local limits guidance referenced above and/or your EPA Region 3 contact.

There are two versions of the spreadsheet available (current version is 5.0). The first is the general spreadsheet that can be used for calculation of local limits in any state. The second version of the spreadsheet is built specifically for POTWs in Pennsylvania, and includes water quality standards and stream flow calculations that apply to Pennsylvania POTWs (version Pa 5.0). Questions regarding either spreadsheet can be directed to:

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2.0 GENERAL

The Region 3 local limits spreadsheet uses a series of tables for the various calculations that are used in local limits development. The formulas used in each table are listed at the bottom of the table, along with an indication of whether the data is user entered or calculated, and the source of the data used if the data is taken from another table in the spreadsheet. The spreadsheet is also color coded so that all data entry cells are yellow, while cells that contain formulas or transfer data from other cells are white. A dash in a white shaded cell generally indicates that information to be transferred to that cell or to be used in the calculation for that cell

[1] Local Limits Development Guidance, July 2004 (EPA 833-R-04-002A) and Local Limits Development Guidance Appendices, July 2004 (EPA 833-R-04-002B). The guidance and appendices can be downloaded from the EPA website at
http://www.epa.gov/npdes/pubs/final_local_limits_guidance.pdf
http://www.epa.gov/npdes/pubs/final_local_limits_appendices.pdf
Copies are also available from the EPA Region III office.

has not been entered in the appropriate cell of the spreadsheet. Cells in which data entry is generally not expected are shaded grey, although these cells are normally open for data entry and/or include the appropriate formulas for the calculations. The spreadsheet is protected so that white cells (and grey cells that contain formulas) cannot be accidently changed to delete formulas.

The spreadsheet is set up to calculate local limits for the standard 15 pollutants[2] as well as total phosphorus, total nitrogen, and beryllium. Total phosphorus and total nitrogen were added to the spreadsheet because many POTWs in Region III, especially those discharging to the Chesapeake Bay, have requirements for these pollutants. Beryllium was added to the spreadsheet since it is regulated by EPA for incineration of sewage sludge. The inclusion of these three pollutants in the spreadsheet is not intended to suggest that all POTWs must calculate a local limit for these pollutants. 19 additional pollutants, specified by the user, can be added to the spreadsheet. Additional pollutants beyond this number can be added although this is a slightly more involved process that is not covered in this manual.

The formulas included in the spreadsheet assume that data are entered with the correct units. Entry of values using other units will result in incorrect calculations. With the exception of sludge data, concentration values must generally be entered with units of mg/l. Sludge data must generally be entered with units of mg/kg dry weight, although sludge standards for incineration disposal use other units. The units required for data entry in each cell are shown at the top of each data entry column.

The spreadsheet has three worksheets - the 'Monitoring Data' worksheet, the 'Inhibition Removals' worksheet, and the 'Limits Calculation' worksheet. The 'Monitoring Data' worksheet is used to determine overall removal rates as well as the average nonindustrial and hauled waste concentrations. The 'Inhibition Removals' worksheet is used to determine removal rates prior to the various processes for which allowable headworks loadings based on inhibition are calculated. The values determined in these two worksheets are used in the 'Limits Calculation' worksheet which calculates the maximum allowable headworks loadings and local limits for each pollutant.

2.1 Headers and Footers - Adding the POTW Name

All three worksheets include several headers and footers that help identify the worksheet. When printed, each worksheet will include a header (on the right) that shows the date that the worksheet was printed. A second header (in the center) identifies the worksheet as either the "POTW Monitoring Data" worksheet, the "Inhibition Removals Data" worksheet, or the "Local Limits Calculation" worksheet. In addition, the worksheets include a footer (on the right) that shows the version of the spreadsheet that was used (e.g., Version 5.0) and a second footer (in the center) that shows the page number.

[2] EPA guidance indicates that at minimum, local limits should be evaluated for arsenic, cadmium, chromium, copper, cyanide, lead, mercury, molybdenum, nickel, selenium, silver, zinc, BOD_5, TSS, and ammonia.

The worksheets also include a header (on the left) that allows the user to identify the POTW for which the local limits calculations are being completed. Built into this header is the phrase "POTW Name: ". To insert the POTW name into the header, select the "Page Layout" tab and click on the arrow in the lower right hand corner of the "Page Setup" box to open the "Page Setup" dialog box. Select the "Header/Footer" tab and click on the "Custom Header" button. Click after "POTW Name: " in the "Left Section" box and type in the POTW name. Click "OK" and then "OK" again. When printed, the POTW name will show on the upper left of each page. Note that adding the POTW name must be done for each worksheet, and adding the POTW name on one worksheet will not add it for the other worksheets.

2.2 Unprotecting and Protecting the Worksheet

At times, such as in order to add additional monitoring data rows to the 'Monitoring Data' or 'Inhibition Removals' worksheets, it may be necessary to make changes to one or more of the worksheets, and the worksheet will need to be unprotected. This can be done by going to the "Home" tab and clicking on "Format" in the "Cells" block, and then "Unprotect Sheet". Note that each worksheet must be unprotected and protected separately, and when the sheet is unprotected, formulas or other information in the white cells can also be revised. Caution should be used when unprotecting the spreadsheet to ensure that formulas are not accidentally deleted or revised and it is recommended that the spreadsheet be protected again as soon as possible. To turn the worksheet protection back on repeat the procedure used to unprotect the sheet - click "Protect Sheet" after clicking on "Format", and then click "OK" in the pop up box.

3.0 MONITORING DATA WORKSHEET

As discussed above, the 'Monitoring Data' worksheet is intended mainly to calculate overall removal rates as well as average nonindustrial and hauled waste concentrations for use in the 'Limits Calculation' worksheet. Note that the worksheet is designed for entry of pollutant concentrations rather than pollutant loadings. For each pollutant, the results of sampling for the influent, effluent, sludge, nonindustrial, and hauled waste (both hauled waste discharged at the influent and hauled waste discharged directly to the sludge processing units) sample points can be entered along with the dates of sampling. The beginning and end of the data entry cells for each pollutant is shown by a thick vertical line.

For each pollutant and sample point, this worksheet will count the number of data points and calculate the average, maximum, and minimum concentration for the data set[3]. The average loading for the data set is also calculated for the influent, effluent, and sludge sampling points (corresponding flows must be entered in the 'Limits Calculation' worksheet in order for the loadings to be calculated). For the influent and effluent, the average loadings are calculated

[3] In this manual, the term 'data set' refers to the monitoring data for one pollutant at one sample point (e.g., the influent data for arsenic).

using the average concentration for that sample point and the average POTW flow from Table 2 of the 'Limits Calculation' worksheet (Table 2b of the Pennsylvania version of the spreadsheet). For the sludge, the average loading is calculated using the average sludge concentration and the average sludge flow to disposal from Table 2 of the 'Limits Calculation' worksheet (Table 2b of the Pennsylvania version of the spreadsheet). In addition, the worksheet calculates the standard deviation of each data set. Any data point that is different from the average concentration by more than twice the standard deviation for that data set is highlighted in red bold font. For a data set with a "normal distribution" these data points may be outliers (see Appendix P of the local limits guidance manual) and may need to be eliminated from the data set (see Section 3.1 of this manual for information on eliminating data from the data set). For each pollutant, the worksheet will calculate the overall removal in three ways:

Average Daily Removal - The influent and effluent data for each sampling date are used to calculate the removal for that date. Note that if either the influent or effluent result is blank no daily removal for that date is calculated. The individual removals for each date are then averaged to obtain the average daily removal. This result is shown in the purple shaded cell for each pollutant at the bottom of the daily removal column.

Mean Influent/Effluent Removal - The average influent concentration and the average effluent concentration are used to calculate the influent/effluent removal rate. This result is shown in the orange shaded cell for each pollutant at the bottom of the effluent column.

Mean Influent/Sludge Removal - The average influent loading and the average sludge loading are used to calculate the average removal rate. The influent/sludge removal result is shown in the blue shaded cell for each pollutant at the bottom of the sludge column. Note that calculation of the mean influent/sludge removal assumes that all of the "removed" pollutant is transferred to the sludge and that the treatment process does not generate that pollutant (i.e., the pollutant is a "conservative" pollutant). This is not the case for cyanide, BOD_5, TSS, ammonia, or total nitrogen, so no mean influent/sludge removal is calculated for these pollutants.

3.1 Data Entry

All of the data entry (yellow) cells in this worksheet are formatted to accept any characters that are typed in the cell. However, the calculation cells at the bottom of each data set (average, maximum, minimum, etc.) are formatted to only use cells that do not contain any non-numeric characters. Therefore, any sample results entered as "<" or using any letters or other characters that are not numbers (other than decimal points) will not be used in determining the averages and removal rates.

Since it is still important to identify which results were reported as non-detectable, a color coding convention is used with the spreadsheet as shown at the bottom of the "Date" column of the spreadsheet. Where the sample result was reported as non-detectable and the detection limit is used as a surrogate for the result, the cell should be shaded light green. Where the sample result was reported as non-detectable and half the detection limit is used as a

surrogate for the result, the cell should be shaded pink. Other colors should be used to shade cells if other surrogates are used, but the submission should indicate the meaning of any other colors used.

The spreadsheet also identifies sample results that are potential outliers in the data set. The spreadsheet calculates the standard deviation of the data set, and any sample result that is different from the average by more than two times the standard deviation is highlighted in red bold font to identify it as a potential outlier. If appropriate (see Appendix P of the local limits guidance), these data points can then be eliminated from the data set as discussed below.

Even where data points are not used in the calculations, it is important to document all of the sample results that were gathered as part of the local limits development process in order to fully document the evaluation of the limits. To do this using the spreadsheet, include all sample results considered for the evaluation in the 'Monitoring Data' worksheet. For any data point that is to be excluded from the data set for any reason, include an 'X' (or any other non-numeric character) in the cell. This will move the result to the left side of the cell and the data point will be ignored in the calculations at the bottom of the column. To further highlight data points that are eliminated from the data set, the cell should be shaded grey. Note that for non-detectable results that are not used in the calculations, the result should be entered with a "<" sign in front of the actual detection level used in the analysis and the cell shaded grey. These values will also be ignored in the calculations at the bottom of the column, but use of the "<" sign will highlight that the original value was reported as non-detectable.

Note that there are separate columns for hauled waste that is received at the influent to the treatment plant and for hauled waste that is received at the sludge processing units (and therefore does not go to the influent of the treatment plant). These data are used differently as explained in Section 4 of this manual and therefore should be entered separately in the spreadsheet.

3.2 Shading Selected Cells

To shade a specific cell, select that cell by clicking on it. On the "Home" tab in the "Font" box, click on the drop down arrow on the "Fill Color" icon and then select the appropriate color.

3.3 Adding Monitoring Dates to the Monitoring Data Worksheet

The 'Monitoring Data' worksheet has space for 40 days of monitoring data. If space for additional monitoring data is needed, rows can be added to the worksheet. To do this, the worksheet will first need to be unprotected (see procedure for unprotecting the worksheet in Section 2.2 of this manual). After unprotecting the worksheet, select one or more entire rows of the worksheet in rows 3 through 40. In the "Clipboard" box on the "Home" tab, click on the "Copy" icon. Next, in the "Cells" box on the "Home" tab, click the drop down arrow for the "Insert" icon and select "Insert Copied Cells". This will add a number of rows equal to the

number of rows selected. Note that the rows selected for copying should not include any entered data since the copying process will copy the data to the new rows. Note also that if you are using the 'Inhibition Removals' worksheet as well, rows will need to be added to that worksheet also (see Section 4.3).

3.4 Adding Pollutants to the Monitoring Data Worksheet

As noted above, the local limits spreadsheet is set up to calculate local limits for a standard set of 15 pollutants plus total phosphorus, total nitrogen, and beryllium, but also has the capacity to add up to 19 additional pollutants of the user's choice. To add pollutants to the 'Monitoring Data' worksheet, no changes to the worksheet are needed other than to identify the pollutants at the top of each column. Note that because the data from the 'Monitoring Data' worksheet is used in the 'Limits Calculation' worksheet, it is important to enter the pollutants in the same order on each worksheet.

Prior to identifying the pollutant at the top of each column, the worksheet will need to be unprotected (see procedure for unprotecting the worksheet in Section 2.2 of this manual).

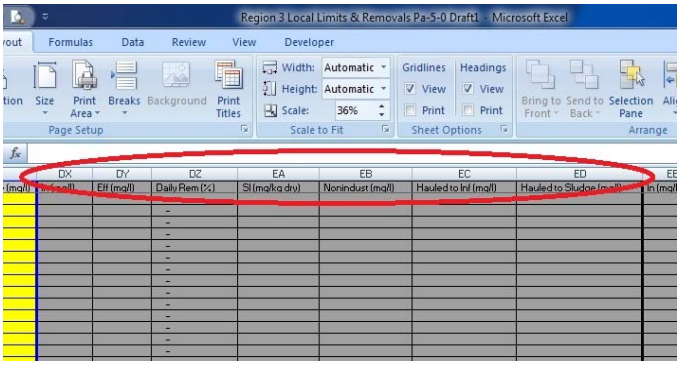

Figure 3-1

The first free area for new pollutants in the worksheet is the area to the right of the data entry area for beryllium (columns "DX" through "ED" - see Figure 3-1). In the "Page Break Preview" view, this area will be shaded grey. Once the worksheet is unprotected, select the column header cell and edit the column header using the editing box immediately above the worksheet. Click in the editing box in front of the existing text and enter the pollutant name or an appropriate abbreviation (see figure 3-2). This should be done in each of the columns for each added pollutant. The columns can be widened to show the entire header name by moving the cursor over the line between the column header letters (e.g., line between "DX" and "DY") and double clicking

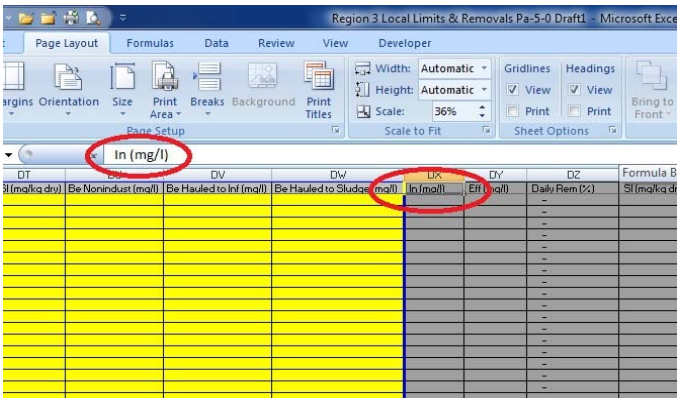

Figure 3-2

3.5 Printing the Monitoring Data Worksheet

The spreadsheet default for the 'Monitoring Data' worksheet is set to print the data for two pollutants on a single page of 8½ X 11 paper. The print area for the worksheet is set to print all of the data through beryllium (columns "A" through "DW" - 9 pages), with the date (column "A") printed on the left of each page. The worksheet is also set to print double sided, although this may depend on the user's printer settings. Because of the shading that is used to highlight the handling of the monitoring data it is recommended that this worksheet be printed in color.

Where additional pollutants have been added, the print area of the worksheet will need to be revised prior to printing. One way to see the area that is set to be printed is through the "Page Break Preview" view. While the spreadsheet has been originally set to the "Page Break Preview" view, if this has been reset, in order to change to the "Page Break Preview" view select the "View" tab and then click on "Page Break Preview" in the "Workbook Views" box. In this view, areas of the worksheet outside of the print area will be shown in grey regardless of the color selected for the individual cells, while page breaks will be shown as a solid or dashed blue line. To extend the print area, select the area of the worksheet to be added for printing (for example, to add one additional pollutant select cells DJ1 through DP54). Once the additional area to be printed is selected, select the "Page Layout" tab, click on the drop down arrow for the "Print Area" icon in the "Page Setup" box and select "Add to Print Area". The print area can also be extended in the "Page Break Preview" view of the spreadsheet by placing the cursor over the solid blue line just before the grey area, left clicking, and dragging the line to the right until all of the areas to be printed are shown in color. If a page break (blue line shown in the "Page Break Preview" view) falls in the middle of the data for a given pollutant, the page break can be adjusted by moving the cursor over the blue line, left clicking, and dragging the line to the left or the right.

To revise the print area to print fewer pollutants, select the areas to be printed (for example, to print data only for arsenic select cells A1 through H54). Once the area to be printed is selected, select the "Page Layout" tab, click on the drop down arrow for the "Print Area" icon in the "Page Setup" box and select "Set Print Area". Once the print area is set, the worksheet can be printed.

4.0 INHIBITION REMOVALS WORKSHEET

The 'Inhibition Removals' worksheet is designed to calculate removal rates for use in the determination of the allowable headworks loadings based on inhibition in the 'Limits Calculation' worksheet, and is similar to the 'Monitoring Data' worksheet. Because they are similar, much of the information in this section of the User's manual repeats information contained in Section 3 of the manual.

As with the 'Monitoring Data' worksheet, this worksheet is designed for entry of pollutant concentrations rather than pollutant loadings. However, to minimize the amount of data that must be entered, the dates and influent values are automatically copied from the 'Monitoring Data' worksheet to the 'Inhibition Removals' worksheet for each pollutant. The

results of sampling of the influent to any of the treatment processes for which allowable headworks loadings based on inhibition will be calculated are left to be entered. The beginning and end of the data entry cells for each pollutant is shown by a thick vertical line.

For each pollutant and sample point, this worksheet will count the number of data points and calculate the average, maximum, and minimum concentration for the data set. The average loading for the data set is also calculated for each of the sampling points (the POTW flow must be entered in the 'Limits Calculation' worksheet in order for the loadings to be calculated). The average loadings are calculated using the average concentration for that sample point and the average POTW flow from Table 2 of the 'Limits Calculation' worksheet (Table 2b of the Pennsylvania version of the spreadsheet). In addition, the worksheet calculates the standard deviation of each data set. Any data point that is different from the average concentration by more than twice the standard deviation for that data set is highlighted in red bold font. For a data set with a "normal distribution" these data points may be outliers (see Appendix P of the local limits guidance manual) and may need to be eliminated from the data set (see Section 4.1 of this manual for information on eliminating data from the data set).

To calculate the removal prior to the activated sludge units, the average influent concentration (the 'In' column in the worksheet) and the average influent to activated sludge concentration (the 'Inf to Act Sl' column in the worksheet) are used with the calculated removal displayed at the bottom of the 'Inf to Act Sl' column in the orange shaded cell. To calculate the removal prior to the trickling filter units, the average influent concentration and the average influent to trickling filter concentration (the 'Inf to Trick Fil' column in the worksheet) are used with the calculated removal displayed at the bottom of the 'Inf to Trick Fil' column in the purple shaded cell. To calculate the removal prior to the nitrification units, the average influent concentration and the average influent to nitrification concentration (the 'Inf to Nitrif' column in the worksheet) are used with the calculated removal displayed at the bottom of the 'Inf to Nitrif' column in the blue shaded cell. Note that if nitrification occurs in the activated sludge units or in the trickling filters, the 'Inf to Nitrif' column does not need to be used and the 'Removal Prior to Activated Sludge' or 'Removal Prior to Trickling Filter' option can be used for the nitrification inhibition calculations (see Section 5.3.3).

4.1 Data Entry

All of the data entry (yellow) cells in this worksheet are formatted to accept any characters that are typed in the cell. However, the calculation cells at the bottom of each data set (average, maximum, minimum, etc.) are formatted to only use cells that do not contain any non-numeric characters. Therefore, any sample results entered as "<" or using any letters or other characters that are not numbers (other than decimal points) will not be used in determining the averages and removal rates.

Since it is still important to identify which results were reported as non-detectable, a color coding convention is used with the spreadsheet as shown at the bottom of the "Date" column of the spreadsheet. Where the sample result was reported as non-detectable and the detection limit is used as a surrogate for the result, the cell should be shaded light green. Where

the sample result was reported as non-detectable and half the detection limit is used as a surrogate for the result, the cell should be shaded pink. Other colors should be used to shade cells if other surrogates are used, but the local limits submission should indicate the meaning of any other colors used.

The spreadsheet also identifies sample results that are potential outliers in the data set. The spreadsheet calculates the standard deviation of the data set, and any sample result that is different from the average by more than two times the standard deviation is highlighted in red bold font to identify it as a potential outlier. If appropriate (see Appendix P of the local limits guidance), these data points can then be eliminated from the data set as discussed below.

Even where data points are not used in the calculations, it is important to document all of the sample results that were gathered as part of the local limits development process in order to fully document the evaluation of the limits. To do this using the spreadsheet, include all sample results considered for the evaluation in the 'Inhibition Removals' worksheet. For any data point that is to be excluded from the data set for any reason, include an 'X' (or any other non-numeric character) in the cell. This will move the result to the left side of the cell and the data point will be ignored in the calculations at the bottom of the column. To further highlight data points that are eliminated from the data set, the cell should be shaded grey. Note that for non-detectable results that are not used in the calculations, the result should be entered with a "<" sign in front of the actual detection level used in the analysis and the cell shaded grey. These values will also be ignored in the calculations at the bottom of the column, but use of the "<" sign will highlight that the original value was reported as non-detectable.

4.2 Shading Selected Cells

To shade a specific cell, select that cell by clicking on it. On the "Home" tab in the "Font" box, click on the drop down arrow on the "Fill Color" icon and then select the appropriate color.

4.3 Adding Monitoring Dates to the Inhibition Removals Worksheet

The 'Inhibition Removals' worksheet has space for 40 days of monitoring data. If space for additional monitoring data is needed, rows can be added to the worksheet. To do this, the worksheet will first need to be unprotected (see procedure for unprotecting the worksheet in Section 2.2 of this manual). After unprotecting the worksheet, select one or more entire rows of the worksheet in rows 3 through 40. In the "Clipboard" box on the "Home" tab, click on the "Copy" icon. Next, in the "Cells" box on the "Home" tab, click the drop down arrow for the "Insert" icon and select "Insert Copied Cells". This will add a number of rows equal to the number of rows selected. Note that the rows selected for copying should not include any entered data since the copying process will copy the data to the new rows. Since the date and influent result are copied from the 'Monitoring Data' worksheet, an equal number of rows should be added to that worksheet prior to adding rows to the 'Inhibition Removals' worksheet. In order to avoid reference errors, the additional rows should be added in the same place in both worksheets.

For example, if rows 11 through 26 (in the 'Monitoring Data' worksheet) are copied and then inserted in the 'Monitoring Data' worksheet, then rows 11 through 26 (in the 'Inhibition Removals' worksheet) should also be copied and inserted in the 'Inhibition Removals' worksheet.

4.4 Adding Pollutants to the Inhibition Removals Worksheet

As noted above, the local limits spreadsheet is set up to calculate local limits for a standard set of 15 pollutants plus total phosphorus, total nitrogen, and beryllium, but also has the capacity to add up to 19 additional pollutants of the user's choice. To add pollutants to the 'Inhibition Removals' worksheet, no changes to the worksheet are needed other than to identify the pollutants at the top of each column. Note that because the data from the 'Inhibition Removals' worksheet is used in the 'Limits Calculation' worksheet, it is important to enter the pollutants in the same order on each worksheet.

Prior to identifying the pollutant at the top of each column, the worksheet will need to be unprotected (see procedure for unprotecting the worksheet in Section 2.2 of this manual).

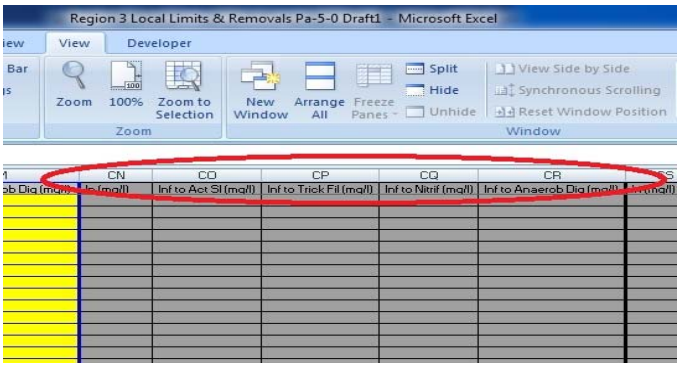

Figure 4-1

The first free area for new pollutants in the worksheet is the area to the right of the data entry area for beryllium (columns "CN" through "CR" - see Figure 4-1). In the "Page Break Preview" view, this area will be shaded grey. Once the worksheet is unprotected, select the column header cell and edit the column header using the editing box immediately above the worksheet. Click in the editing box in front of the existing text and enter the pollutant name or an appropriate abbreviation (see figure 4-2). This should be done in each of the columns for each added pollutant. The columns can be widened to show the entire header name by moving the cursor over the line between the column header letters (e.g., line between "CN" and "CO") and double clicking.

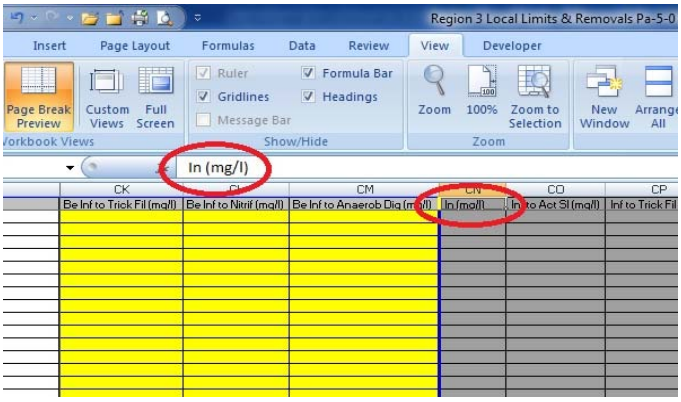

Figure 4-2

4.5 Printing the Inhibition Removals Worksheet

The spreadsheet default for the 'Inhibition Removals' worksheet is set to print the data for two pollutants on a single page of 8½ X 11 paper. The print area for the worksheet is set to print all of the data through beryllium (columns "A" through "CM" - 9 pages), with the date (column "A") printed on the left of each page. The worksheet is also set to print double sided, although this may depend on the user's printer settings. Because of the shading that is used to highlight the handling of the monitoring data it is recommended that this worksheet be printed in color.

Where additional pollutants have been added, the print area of the worksheet will need to be revised prior to printing. One way to see the area that is set to be printed is through the "Page Break Preview" view. While the spreadsheet has been originally set to the "Page Break Preview" view, if this has been reset, in order to change to the "Page Break Preview" view select the "View" tab and then click on "Page Break Preview" in the "Workbook Views" box. In this view, areas of the worksheet outside of the print area will be shown in grey regardless of the color selected for the individual cells, while page breaks will be shown as a solid or dashed blue line. To extend the print area, select the area of the worksheet to be added for printing (for example, to add one additional pollutant select cells CN1 through CR55). Once the additional area to be printed is selected, select the "Page Layout" tab, click on the drop down arrow for the "Print Area" icon in the "Page Setup" box and select "Add to Print Area". The print area can also be extended in the "Page Break Preview" view of the spreadsheet by placing the cursor over the solid blue line just before the grey area, left clicking, and dragging the line to the right until all of the areas to be printed are shown in color. If a page break (blue line shown in the "Page Break Preview" view) falls in the middle of the data for a given pollutant, the page break can be adjusted by moving the cursor over the blue line, left clicking, and dragging the line to the left or the right.

To revise the print area to print fewer pollutants, select the areas to be printed (for example, to print data only for arsenic select cells A1 through F55). Once the area to be printed is selected, select the "Page Layout" tab, click on the drop down arrow for the "Print Area" icon in the "Page Setup" box and select "Set Print Area". Once the print area is set, the worksheet can be printed.

5.0 LIMITS CALCULATION WORKSHEET

The 'Limits Calculation' worksheet calculates the maximum allowable headworks loading and local limit for each pollutant included in the evaluation through a series of tables. The formulas used in each calculation cell are shown at the bottom of each table, along with the source of any data that is transferred from other tables and an indication of whether the data in a given cell is calculated, transferred, or must be entered by the user. In addition, the 'Limits Calculation' worksheet includes several tables at the end of the worksheet that are intended to help the user assess the appropriateness of the calculated limits.

The 'Limits Calculation' worksheet generally follows the process and uses the formulas described in EPA's local limits guidance manual. Allowable headworks loadings are calculated based on protection of water quality, prevention of inhibition, and protection of sludge quality. The most stringent allowable headworks loading (maximum allowable headworks loading) is selected and then used to calculate a uniform concentration local limit. Note that there are methods of allocating the maximum allowable headworks loading to obtain local limits other than the uniform concentration method, and the use of the uniform concentration method in this spreadsheet is not intended to suggest that this is the only method, or even the preferred method, of allocating the available loading. If the user wants to allocate the available loading through another method, these methods are not supported by this spreadsheet, although the maximum allowable headworks loading calculated in the spreadsheet should generally be the basis of any allocation method that is chosen. Note also that in order for the calculations to provide correct results, all data must be entered using the appropriate units, which are shown in the box identifying the needed data at the top of each table column and are described in the information listed below the table.

5.1 General Information

Tables 1 and 2 (2a and 2b in the Pennsylvania version of the spreadsheet) of the spreadsheet include information that will be used throughout the spreadsheet. This includes the type of treatment processes at the POTW as well as the various wastewater and sludge flows and receiving stream characteristics.

5.1.1 Unit Operations – Table 1

Enter an 'X' (or any other character) in the yellow cell under any unit process that is present at the POTW. Placing an 'X' in any of these cells activates the appropriate table later in the spreadsheet for calculation of allowable headworks loadings based on inhibition of that type of treatment unit, or for incineration for calculation of allowable headworks loadings based on incineration disposal of sludge. The spreadsheet will not calculate an allowable headworks loading for any of these processes that are not activated by placing an 'X' in the appropriate cell.

5.1.2 POTW and Receiving Stream Data - Table 2 (General Version)

Enter data in the appropriate yellow cell below the box identifying the needed data. The POTW, IU, sludge, and hauled waste flows should be actual average flows rather than design flows. The sludge flow to digester is only needed if the calculations will include inhibition calculations for anaerobic digesters, and therefore this cell can be left blank if there are no anaerobic digesters. If no hauled waste is received by the POTW and/or incineration is not used by the POTW, these cells can be left blank as well (the spreadsheet assumes a blank is a zero). For stream flows, use the appropriate flow used by your permitting agency for each type of water quality standard. If the permitting agency adjusts the stream flow for use in its water quality calculations, the adjusted stream flow should be entered here. Hauled waste flows should

include only those flows that will not be regulated through the local limits. Any hauled waste that is to be regulated through the local limits should be considered IU flow. Note that the hauled waste flow discharged at the influent is entered separately from the hauled waste flow discharged directly to the sludge processing units. Hauled waste flow discharged at the influent is considered a nonindustrial flow, and the pollutant loading from this flow is subtracted from the maximum allowable headworks loading in Table 18. Hauled waste flow that is discharged directly to the sludge processing units is also considered a nonindustrial flow but the loading associated with this flow is subtracted from the allowable headworks loading based on sludge disposal in Table 16 rather than the maximum allowable headworks loading in Table 18.

5.1.3 Stream Flow Partial Mix Factors – Table 2a (Pennsylvania Version)

For calculating effluent limits based on most water quality standards, Pennsylvania uses the $Q_{7\text{-}10}$ and harmonic mean stream flows along with a partial mix factor to adjust the stream flows. However, Pennsylvania calculates effluent limits for some water quality standards (e.g., total dissolved solids) based on the receiving stream flow at the nearest downstream drinking water intake. Pennsylvania also adjusts the stream flows used with the acute, chronic, and cancer risk level water quality standards through the use of partial mix factors. These partial mix factors represent the portion of the receiving stream that is mixed with the discharge after the compliance time for the standard. The $Q_{7\text{-}10}$, harmonic mean, and drinking water intake stream flows as well as the partial mix factors are entered directly in Table 2a of the worksheet in the yellow shaded cells. Both the stream flows and the partial mix factors can often be found in PADEP's water quality protection report (permit fact sheet) developed at the time of the drafting of the POTW's NPDES permit.

5.1.4 POTW and Receiving Stream Data – Table 2b (Pennsylvania Version)

Enter data in the appropriate yellow cell below the box identifying the needed data. The POTW, IU, sludge, and hauled waste flows should be actual average flows rather than design flows, and the receiving stream hardness should be the actual hardness of the receiving stream. The hardness can often be found in PADEP's water quality protection report (permit fact sheet) developed at the time of the drafting of the POTW's NPDES permit. The sludge flow to digester is only needed if the calculations will include inhibition calculations for anaerobic digesters, and therefore this cell can be left blank if there are no anaerobic digesters. If no hauled waste is received by the POTW and/or incineration is not used by the POTW, these cells can be left blank as well (the spreadsheet assumes a blank is a zero). Hauled waste flows should include only those flows that will not be regulated through the local limits. Any hauled waste that is to be regulated through the local limits should be considered IU flow. Note that the hauled waste flow discharged at the influent is entered separately from the hauled waste flow discharged directly to the sludge processing units. Hauled waste flow discharged at the influent is considered a nonindustrial flow, and the pollutant loading from this flow is subtracted from the maximum allowable headworks loading in Table 18. Hauled waste flow that is discharged directly to the sludge processing units is also considered a nonindustrial flow but the loading associated with

this flow is subtracted from the allowable headworks loading based on sludge disposal in Table 16 rather than the maximum allowable headworks loading in Table 18.

The stream flows listed in Table 2b are calculated based on the stream flows and partial mix factors listed in Table 2a. The stream flow for chronic water quality standards is calculated using the $Q_{7\text{-}10}$ stream flow and the chronic partial mix factor. The stream flow for acute standards is calculated using the $Q_{7\text{-}10}$ stream flow and the acute partial mix factor. The stream flow for carcinogen human health standards is calculated using the harmonic mean stream flow and the cancer risk level partial mix factor. The stream flow for threshold human health standards is the $Q_{7\text{-}10}$ stream flow and is not adjusted using a partial mix factor. If the harmonic mean stream flow is not available, the spreadsheet will calculate it using the $Q_{7\text{-}10}$ stream flow and the formula shown below. The resulting value will then be adjusted using the cancer risk level partial mix factor to determine the stream flow for use with the carcinogen human health standards.

$$Q_{hm} = 7.43 * (Q_{7\text{-}10})^{0.874}$$

5.2 Allowable Headworks Loadings Based on Protection of Water Quality

Tables 3 through 7 of the worksheet calculate the allowable headworks loading for each pollutant based on protection of water quality. Table 3 calculates the allowable headworks loading for each pollutant based on the POTW's NPDES permit limits, Table 4 calculates the allowable headworks loading for each pollutant based on chronic water quality standards, Table 5 calculates the allowable headworks loading for each pollutant based on acute water quality standards, Table 6 calculates the allowable headworks loading for each pollutant based on human health standards and drinking water intake standards, and Table 7 selects the most stringent of these allowable headworks loadings as the allowable headworks loading for each pollutant based on protection of water quality.

5.2.1 Allowable Headworks Loadings Based on NPDES Effluent Limits – Table 3

This table and all subsequent tables in the 'Limits Calculation' worksheet include the standard 15 pollutants, total phosphorus, total nitrogen, and beryllium. The worksheet has space for an addition 19 pollutants to be entered in the yellow cells in the "Pollutant" column of this table. As noted in the discussion on the 'Monitoring Data' and 'Inhibition Removals' worksheets, pollutants must be added in this table in the same order that they are added in the 'Monitoring Data' and 'Inhibition Removals' worksheets because removal rates and other data are taken from the 'Monitoring Data' and 'Inhibition Removals' worksheets and used in the 'Limits Calculation' worksheet. Once entered in Table 3, all additional pollutants will automatically be added to the remaining tables in the 'Limits Calculation' worksheet.

The value for the "POTW Flow" column is taken from Table 2 (Table 2b in the Pennsylvania version) and therefore is not directly entered in this Table. The values in the "NPDES Limit" column are user entered from the POTW's NPDES permit. In addition, if water

quality based effluent limits were calculated using the state water quality model but not included in the POTW's NPDES permit, these values should be entered as NPDES limits in this table. The water quality based effluent limits generally represent the limits that would have been included in the POTW's NPDES permit if limits had been determined to be necessary. If the NPDES limit column is left blank for a pollutant no allowable headworks loading based on NPDES limits will be calculated for that pollutant.

The values for the "Removal Efficiency" column are taken from the 'Monitoring Data' worksheet, the "User Entered Removal Efficiency" column in this Table, or are based on the default removal rates from EPA's local limits guidance. The selection of the removal efficiency for use in the calculations is made in the "Select Removal Efficiency" column. To select a removal efficiency, click in the cell for the appropriate pollutant in the "Select Removal Efficiency" column. Click on the arrow for the drop down box that appears next to the cell, and select the removal efficiency to be used in the calculations for that pollutant. Repeat the process for each pollutant included in the evaluation. The drop down box will allow selection of "User Entered" (value from the "User Entered Removal Efficiency" column of this table), "Influent/Effluent" (removal from 'Monitoring Data' worksheet using average influent and average effluent concentrations – the orange cell), "Daily Removal" (removal from 'Monitoring Data' worksheet using the average of the daily removals – the purple cell), "Influent/Sludge" (removal from 'Monitoring Data' worksheet using average influent load and average sludge load – the blue cell), or "Default" for various treatment plant types (default removal from EPA's local limits guidance for specified treatment unit). For the "Default" removals, the median removal from the guidance for each type of process is built into the spreadsheet. To use other default data or another value calculated by the user, the removal rate is entered in the "User Entered Removal Efficiency" column and "User Entered" selected. The removal selection is originally set to "Influent/Effluent" and this removal will be shown in the "Removal Efficiency" column unless changed by the user.

The cells in this table for BOD_5 and total suspended solids are shaded grey. EPA guidance indicates that the maximum allowable headworks loadings for these pollutants should be based on the design loading of the treatment plant rather than the allowable headworks loadings calculations, and therefore no calculations for these pollutants need be done in Table 3. Although the cells for ammonia, total phosphorus, and total nitrogen are not shaded grey, this same approach is intended for these pollutants if the treatment plant is designed to treat for ammonia, total phosphorus, and/or total nitrogen. Other pollutants for which the treatment plant is designed should be handled in this same manner and no allowable headworks calculation based on water quality performed. However, note that if influent and effluent data is entered in the 'Monitoring Data' worksheet for these pollutants, a removal rate will be calculated and entered in the "Removal Efficiency" column. An allowable headworks loading will then be calculated if a value is entered in the "NPDES Limit" column. Data entry cells for the treatment plant design loadings are provided later in the worksheet in Table 17.

Note that if an allowable headworks loading based on NPDES limits is calculated for a pollutant in Table 3, no allowable headworks loading based on water quality standards is calculated in Tables 4 through 6. Since NPDES limits should protect against violations of water quality standards, calculation of the allowable headworks loading based on water quality

standards is not necessary if the allowable headworks loading based on NPDES limits is calculated for a given pollutant.

5.2.2 Allowable Headworks Loadings Based on Chronic Water Quality Standards – Table 4

The value for the "POTW Flow" column is taken from Table 2 (Table 2b in the Pennsylvania version), the values for the "Receiving Stream Flow" column are taken from Table 2 (Stream Flow for Chronic WQS) or Table 2b (Pennsylvania version), and the values for the "Removal Efficiency" column are taken from Table 3. None of these values are entered directly in this table. The values in the "Receiving Stream Concentration" and "Chronic WQS" column are user entered from the appropriate source. If the "Receiving Stream Concentration" cell is left blank, this value is assumed to be zero in the calculations. If the "Chronic WQS" cell is left blank, no calculation is performed for that pollutant. In the Pennsylvania version of the spreadsheet, the Pennsylvania chronic water quality standards for the pollutants arsenic through zinc are built into the spreadsheet where available, and the cells for molybdenum and silver are shaded grey since Pennsylvania does not have chronic water quality standards for either of these pollutants. Note that some of the Pennsylvania chronic water quality standards are hardness dependent and will not be shown until the receiving stream hardness is entered in Table 2b. Note also that some Pennsylvania chronic water quality standards are expressed as dissolved metal standards which are derived by applying a dissolved metal conversion factor to the total metal standard. Since local limits are determined for total metals, the dissolved metal conversion factors have been removed from the water quality standards in this table. Chronic water quality standards for any pollutants manually added to the spreadsheet must be entered by the user in the "Chronic WQS" column.

The cells in this table for BOD_5 and total suspended solids are shaded grey. EPA guidance indicates that the maximum allowable headworks loadings for these pollutants should be based on the design loading of the treatment plant rather than the allowable headworks loadings calculations, and therefore no calculations for these pollutants need be done in Table 4. Although the cells for ammonia, total phosphorus, and total nitrogen are not shaded grey, this same approach is intended for these pollutants if the treatment plant is designed to treat for ammonia, total phosphorus, and/or total nitrogen. Other pollutants for which the treatment plant is designed should be handled in this same manner and no allowable headworks calculation based on water quality performed.

5.2.3 Allowable Headworks Loadings Based on Acute Water Quality Standards – Table 5

The value for the "POTW Flow" column is taken from Table 2 (Table 2b in the Pennsylvania version), the values for the "Receiving Stream Flow" column are taken from Table 2 (Stream Flow for Acute WQS) or Table 2b (Pennsylvania version), the values for the "Receiving Stream Concentration" column are taken from Table 4, and the values for the "Removal Efficiency" column are taken from Table 3. None of these values are entered directly

in this table. The values in the "Acute WQS" column are user entered from the appropriate source. If the "Acute WQS" cell is left blank, no calculation is performed for that pollutant. In the Pennsylvania version of the spreadsheet, the Pennsylvania acute water quality standards for the pollutants arsenic through zinc are built into the spreadsheet where available, and the cells for molybdenum and selenium are shaded grey since Pennsylvania does not have acute water quality standards for either of these pollutants. Note that some of the Pennsylvania acute water quality standards are hardness dependent and will not be shown until the receiving stream hardness is entered in Table 2b. Note also that some Pennsylvania acute water quality standards are expressed as dissolved metal standards which are derived by applying a dissolved metal conversion factor to the total metal standard. Since local limits are determined for total metals, the dissolved metal conversion factors have been removed from the water quality standards in this table. Acute water quality standards for any pollutants manually added to the spreadsheet must be entered by the user in the "Acute WQS" column.

The cells in this table for BOD_5 and total suspended solids are shaded grey. EPA guidance indicates that the maximum allowable headworks loadings for these pollutants should be based on the design loading of the treatment plant rather than the allowable headworks loadings calculations, and therefore no calculations for these pollutants need be done in Table 5. Although the cells for ammonia, total phosphorus, and total nitrogen are not shaded grey, this same approach is intended for these pollutants if the treatment plant is designed to treat for ammonia, total phosphorus, and/or total nitrogen. Other pollutants for which the treatment plant is designed should be handled in this same manner and no allowable headworks calculation based on water quality performed.

5.2.4 Allowable Headworks Loadings Based on Human Health Water Quality Standards – Table 6

The value for the "POTW Flow" column is taken from Table 2 (Table 2b in the Pennsylvania version), the values for the "Receiving Stream Flow" column are taken from Table 2 ("Stream Flow for Threshold Human Health WQS" or "Stream Flow for Carcinogen Human Health WQS") or Table 2b (Pennsylvania version), the values for the "Receiving Stream Concentration" column are taken from Table 4, and the values for the "Removal Efficiency" column are taken from Table 3. None of these values are entered directly in this table. The values in the "Human Health WQS" column are user entered from the appropriate source. If the "Human Health WQS" cell is left blank, no calculation is performed for that pollutant. In the Pennsylvania version of the spreadsheet, the Pennsylvania human health water quality standards for the pollutants arsenic through zinc are built into the spreadsheet where available. Human health water quality standards for any pollutants manually added to the spreadsheet must be entered by the user in the "Human Health WQS" column.

Table 6 also includes a "Select Basis of Standard" column. This column allows the user to select whether each human health standard is based on threshold human health effects or a cancer risk level. The Pennsylvania version of the spreadsheet also allows selection of "Public Water Supply" for use with those standards that apply at the nearest downstream drinking water intake. To select the basis of the standard, click on the cell in the "Select Basis of Standard" column for the pollutant of concern and then click on the arrow that appears next to the cell and

select the appropriate choice. If "Threshold Human Health" is selected, the flow from "Stream Flow for Threshold Human Health WQS" will be automatically entered in the "Receiving Stream Flow" column for that pollutant. If "Cancer Risk Level" is selected, the flow from "Stream Flow for Carcinogen Human Health WQS" will be automatically entered in the "Receiving Stream Flow" column for that pollutant. If "Public Water Supply" is selected in the Pennsylvania version, the flow from "Drinking Water Intake Stream Flow" will be automatically entered in the "Receiving Stream Flow" column for that pollutant. The selection of "Threshold Human Health", "Cancer Risk Level", or Public Water Supply" (for the Pennsylvania version) must be made for each pollutant for which a value is entered in the "Human Health WQS" column. If no selection is made, no receiving stream flow will be entered and no allowable headworks loading calculation will be performed.

The cells in this table for BOD_5 and total suspended solids are shaded grey. EPA guidance indicates that the maximum allowable headworks loadings for these pollutants should be based on the design loading of the treatment plant rather than the allowable headworks loadings calculations, and therefore no calculations for these pollutants need be done in Table 6. Although the cells for ammonia, total phosphorus, and total nitrogen are not shaded grey, this same approach is intended for these pollutants if the treatment plant is designed to treat for ammonia, total phosphorus, and/or total nitrogen. Other pollutants for which the treatment plant is designed should be handled in this same manner and no allowable headworks calculation based on water quality performed.

5.2.5 Comparison of Allowable Headworks Loadings Based on Water Quality Standards – Table 7

The values in the "Allowable Headworks Loading (NPDES)" column are taken from Table 3, the values in the "Allowable Headworks Loading (CHRONIC)" column are taken from Table 4, the values in the "Allowable Headworks Loading (ACUTE)" column are taken from Table 5, and the values in the "Allowable Headworks Loading (HUMAN HEALTH)" column are taken from Table 6. The lowest value from each of these columns for each pollutant is selected and entered in the "Allowable Headworks Loading (WATER QUALITY)" column. None of these values are entered directly in this table.

5.3 Allowable Headworks Loadings Based on Protection Against Inhibition

Tables 8 through 13 of the worksheet calculate the allowable headworks loading for each pollutant based on protection against inhibition. Table 8 calculates the allowable headworks loading for each pollutant based on protection against inhibition of activated sludge treatment units, Table 9 calculates the allowable headworks loading for each pollutant based on protection against inhibition of trickling filter treatment units, Table 10 calculates the allowable headworks loading for each pollutant based on protection against inhibition of nitrification treatment units, Table 11 calculates the allowable headworks loading for each pollutant based on protection against inhibition of anaerobic digester treatment units for conservative pollutants, Table 12 calculates the allowable headworks loading for each pollutant based on protection against

inhibition of anaerobic digester treatment units for non-conservative pollutants, and Table 13 selects the most stringent of these allowable headworks loadings as the allowable headworks loading for each pollutant based on protection against inhibition. In addition, Table 13 will adjust the allowable headworks loading based on protection against inhibition for a pollutant if no inhibition has occurred at the treatment plant and the treatment plant has previously accepted levels of the pollutant that are higher than the calculated allowable headworks loading for that pollutant based on protection against inhibition.

Conservative pollutants are those pollutants (such as metals) that are either discharged to the effluent or to the sludge without undergoing volatilization, biodegradation, or similar changes in the treatment plant. Non-conservative pollutants are those pollutants that are not conservative pollutants (such as volatile organic pollutants). Of the pollutants built into the spreadsheet, cyanide, ammonia, BOD_5, total suspended solids, and total nitrogen are considered non-conservative pollutants.

5.3.1 Allowable Headworks Loadings Based on Activated Sludge Inhibition – Table 8

In order to "activate" this table, the user must indicate that an activated sludge unit is present at the treatment plant by entering an "X" in the appropriate cell in Table 1. Once the table is activated, available inhibition criteria for the standard 15 pollutants, total phosphorus, total nitrogen, and beryllium are shown in the "Activated Sludge Inhibition Level" column. These criteria are from EPA's local limits guidance. Where a range of values is provided in the EPA guidance, the worksheet uses the lowest value in the range to provide the most protection against inhibition. If no inhibition criterion is provided in EPA's guidance for a given pollutant, the cell is available for a user entered inhibition criterion. However, in order to revise an inhibition value that is built into the table, the worksheet must be unprotected (see Section 2.2) and the value manually entered. If this is done, the value originally provided in the table is overwritten and lost. Note that Table 13 of the worksheet provides an opportunity to enter higher inhibition levels if appropriate. Appropriate inhibition criteria for any pollutants manually added to the spreadsheet must be entered by the user in the "Activated Sludge Inhibition Level" column if available. If the "Activated Sludge Inhibition Level" column is left blank for any pollutant, an allowable headworks loading based on activated sludge inhibition is not calculated for that pollutant.

The value in the "POTW Flow" column is taken from Table 2 (Table 2b in the Pennsylvania version) and therefore is not directly entered in this table. The values for the "Removal Efficiency" column are either the removal prior to activated sludge determined in the 'Inhibition Removals' worksheet, the default primary treatment removals from EPA's local limits guidance, or user entered. The selection of the removal efficiency for use in the calculations is made in the "Select Removal Efficiency" column. To select a removal efficiency, click in the cell for the appropriate pollutant in the "Select Removal Efficiency" column. Click on the arrow for the drop down box that appears next to the cell, and select the removal efficiency to be used in the calculations for that pollutant. Repeat the process for each pollutant included in the evaluation. The drop down box will allow selection of "User Entered" (value

from the "User Entered Removal Efficiency" column of this table), "Removal Prior to Activated Sludge (value from the 'Inhibition Removals' worksheet – orange shaded cell), or "Default (Through Primary)". For the "Default" removals, the removal through primary treatment from the EPA local limits guidance is built into the spreadsheet. To use other default data or another value calculated by the user other than the removal calculated in the 'Inhibition Removals' worksheet, the removal rate is entered in the "User Entered Removal Efficiency" column and "User Entered" selected. The removal selection is originally set to "Default (Through Primary)" and when this table is activated, this removal will be shown in the "Removal Efficiency" column and used in the calculations unless changed by the user.

Note that EPA guidance indicates that the maximum allowable headworks loading for BOD_5 and total suspended solids should be based on the treatment plant design loading and therefore these cells are colored grey indicating that allowable headworks loading calculations for these pollutants are not intended to be included in this table. However, if the appropriate information is entered in these cells the worksheet will perform the inhibition calculations for these pollutants as well. Although the cells for ammonia, total phosphorus, and total nitrogen are not shaded grey, this same approach is intended for these pollutants if the treatment plant is designed to treat for ammonia, total phosphorus, and/or total nitrogen. Other pollutants for which the treatment plant is designed should be handled in this same manner and no allowable headworks calculation based on inhibition performed.

5.3.2 Allowable Headworks Loadings Based on Trickling Filter Inhibition – Table 9

In order to "activate" this table, the user must indicate that a trickling filter unit is present at the treatment plant by entering an "X" in the appropriate cell in Table 1. Once the table is activated, available inhibition criteria for the standard 15 pollutants, total phosphorus, total nitrogen, and beryllium are shown in the "Trickling Filter Inhibition Level" column. These criteria are from EPA's local limits guidance. Where a range of values is provided in the EPA guidance, the worksheet uses the lowest value in the range to provide the most protection against inhibition. If no inhibition criterion is provided in EPA's guidance for a given pollutant, the cell is available for a user entered inhibition criterion. However, in order to revise an inhibition value that is built into the table, the worksheet must be unprotected (see Section 2.2) and the value manually entered. If this is done, the values originally provided in the table are overwritten and lost. Note that Table 13 of the worksheet provides an opportunity to enter higher inhibition levels if appropriate. Appropriate inhibition criteria for any pollutants manually added to the spreadsheet must be entered by the user in the "Trickling Filter Inhibition Level" column if available. If the "Trickling Filter Inhibition Level" column is left blank for any pollutant, an allowable headworks loading based on trickling filter inhibition is not calculated for that pollutant.

The value for the "POTW Flow" column is taken from Table 2 (Table 2b in the Pennsylvania version) and therefore is not directly entered in this table. The values for the "Removal Efficiency" column are either the removal prior to trickling filter determined in the 'Inhibition Removals' worksheet, the default treatment removals from EPA's local limits

guidance, or user entered. Default removal efficiencies for more than primary treatment are provided to account for different treatment systems. The selection of the removal efficiency for use in the calculations is made in the "Select Removal Efficiency" column. To select a removal efficiency, click in the cell for the appropriate pollutant in the "Select Removal Efficiency" column. Click on the arrow for the drop down box that appears next to the cell, and select the removal efficiency to be used in the calculations for that pollutant. Repeat the process for each pollutant included in the evaluation. The drop down box will allow selection of "User Entered" (value from the "User Entered Removal Efficiency" column of this table), "Removal Prior to Trickling Filter (value from the 'Inhibition Removals' worksheet – purple shaded cell), or one of several default removals. If a default removal is used, select the available removal that most closely matches the treatment units in place upstream of the trickling filter units being evaluated for inhibition. For example, if the treatment plant uses a trickling filter for polishing after the activated sludge units and a default removal is needed, the default removal through activated sludge would be selected. To use other default data or another value calculated by the user other than the removal calculated in the 'Inhibition Removals' worksheet, the removal rate is entered in the "User Entered Removal Efficiency" column and "User Entered" selected. The removal selection is originally set to "Default (Through Primary)" unless no default data is available for primary treatment. When this table is activated, this removal will be shown in the "Removal Efficiency" column and used in the calculations unless changed by the user.

Note that EPA guidance indicates that the maximum allowable headworks loading for BOD_5 and total suspended solids should be based on the treatment plant design loading and therefore these cells are colored grey indicating that allowable headworks loading calculations for these pollutants are not intended to be included in this table. However, if the appropriate information is entered in these cells the worksheet will perform the inhibition calculations for these pollutants as well. Although the cells for ammonia, total phosphorus, and total nitrogen are not shaded grey, this same approach is intended for these pollutants if the treatment plant is designed to treat for ammonia, total phosphorus, and/or total nitrogen. Other pollutants for which the treatment plant is designed should be handled in this same manner and no allowable headworks calculation based on inhibition performed.

5.3.3 Allowable Headworks Loadings Based on Nitrification Inhibition – Table 10

In order to "activate" this table, the user must indicate that a nitrification unit is present at the treatment plant by entering an "X" in the appropriate cell in Table 1. Note that if nitrification occurs in the activated sludge units, both "Activated Sludge Present?" and "Nitrification Present?" should be selected in Table 1. Once the table is activated, available inhibition criteria for the standard 15 pollutants, total phosphorus, total nitrogen, and beryllium are shown in the "Nitrification Inhibition Level" column. These criteria are from EPA's local limits guidance. Where a range of values is provided in the EPA guidance, the worksheet uses the lowest value in the range to provide the most protection against inhibition. If no inhibition criterion is provided in EPA's guidance for a given pollutant, the cell is available for a user entered inhibition criterion. However, in order to revise an inhibition value that is built into the table, the worksheet must be unprotected (see Section 2.2) and the value manually entered. If this is done,

the values originally provided in the table are overwritten and lost. Note that Table 13 of the worksheet provides an opportunity to enter higher inhibition levels if appropriate. Appropriate inhibition criteria for any pollutants manually added to the spreadsheet must be entered by the user in the "Nitrification Inhibition Level" column if available. If the "Nitrification Inhibition Level" column is left blank for any pollutant, an allowable headworks loading based on nitrification inhibition is not calculated for that pollutant.

The value in the "POTW Flow" column is taken from Table 2 (Table 2b in the Pennsylvania version) and therefore is not directly entered in this table. The values for the "Removal Efficiency" column are either the removal prior to nitrification determined in the 'Inhibition Removals' worksheet, the removal prior to activated sludge determined in the 'Inhibition Removals' worksheet, the removal prior to trickling filter determined in the 'Inhibition Removals' worksheet, the default treatment removals from EPA's local limits guidance, or user entered. Default removal efficiencies for more than primary treatment are provided to account for different treatment systems. The selection of the removal efficiency for use in the calculations is made in the "Select Removal Efficiency" column. To select a removal efficiency, click in the cell for the appropriate pollutant in the "Select Removal Efficiency" column. Click on the arrow for the drop down box that appears next to the cell, and select the removal efficiency to be used in the calculations for that pollutant. Repeat the process for each pollutant included in the evaluation. The drop down box will allow selection of "User Entered" (value from the "User Entered Removal Efficiency" column of this table), "Removal Prior to Nitrification (value from the 'Inhibition Removals' worksheet – blue shaded cell), "Removal Prior to Activated Sludge (value from the 'Inhibition Removals' worksheet – orange shaded cell), "Removal Prior to Trickling Filter (value from the 'Inhibition Removals' worksheet – purple shaded cell), or one of several default removals. If a calculated removal from the 'Inhibition Removals' worksheet or a default removal is used, select the available removal that most closely matches the treatment units in place upstream of the nitrification units being evaluated for inhibition. For example, if the treatment plant achieves nitrification in the activated sludge units and the treatment plant has primary treatment prior to the activated sludge units, the "Removal Prior to Activated Sludge" or the default removal through primary treatment would be selected if a default removal is needed. To use other default data or another value calculated by the user other than the removal calculated in the 'Inhibition Removals' worksheet, the removal rate is entered in the "User Entered Removal Efficiency" column and "User Entered" selected. The removal selection is originally set to "Default (Through Primary)" unless no default data is available for primary treatment. When this table is activated, this removal will be shown in the "Removal Efficiency" column and used in the calculations unless changed by the user.

Note that EPA guidance indicates that the maximum allowable headworks loading for BOD_5 and total suspended solids should be based on the treatment plant design loading and therefore these cells are colored grey indicating that allowable headworks loading calculations for these pollutants are not intended to be included in this table. However, if the appropriate information is entered in these cells the worksheet will perform the inhibition calculations for these pollutants as well. Although the cells for ammonia, total phosphorus, and total nitrogen are not shaded grey, this same approach is intended for these pollutants if the treatment plant is designed to treat for ammonia, total phosphorus, and/or total nitrogen. Other pollutants for

which the treatment plant is designed should be handled in this same manner and no allowable headworks calculation based on inhibition performed.

5.3.4 Allowable Headworks Loadings Based on Anaerobic Digester Inhibition (Conservative Pollutants) – Table 11

In order to "activate" this table, the user must indicate that an anaerobic digester unit is present at the treatment plant by entering an "X" in the appropriate cell in Table 1. Once the table is activated, available inhibition criteria for the standard 11 metals, total phosphorus, and beryllium are shown in the "Anaerobic Digester Inhibition Level" column (these are the conservative pollutants from the standard 15 pollutants plus total phosphorus, total nitrogen, and beryllium). These criteria are from EPA's local limits guidance. Where a range of values is provided in the EPA guidance, the worksheet uses the lowest value in the range to provide the most protection against inhibition. If no inhibition criterion is provided in EPA's guidance for a given pollutant, the cell is available for a user entered inhibition criterion. However, in order to revise an inhibition value that is built into the table, the worksheet must be unprotected (see Section 2.2) and the value manually entered. If this is done, the values originally provided in the table are overwritten and lost. Note that Table 13 of the worksheet provides an opportunity to enter higher inhibition levels if appropriate. Appropriate inhibition criteria for any pollutants manually added to the spreadsheet must be entered by the user in the "Anaerobic Digester Inhibition Level" column if available. If the "Anaerobic Digester Inhibition Level" column is left blank for any pollutant, an allowable headworks loading based on anaerobic digester inhibition is not calculated for that pollutant.

The values in the "POTW Flow" and the "Sludge Flow to Digester" columns are taken from Table 2 (Table 2b in the Pennsylvania version) and therefore are not directly entered in this table. The values for the "Removal Efficiency" column are taken from the "Removal Efficiency" column in Table 3 (overall removal efficiency). Since Table 11 addresses only conservative pollutants, the calculations for this table assume that all pollutants removed from the wastewater are sent to the digester. Note that for the standard 15 pollutants plus total phosphorus, total nitrogen, and beryllium that are built into the spreadsheet, the pollutants cyanide, ammonia, BOD_5, total suspended solids, and total nitrogen are not conservative pollutants and therefore these cells are colored grey indicating that allowable headworks loading calculations for these pollutants are not intended to be included in this table. However, if the appropriate information is entered in these cells the worksheet will perform the inhibition calculations for these pollutants as well. Note that any pollutants added in Table 3 will be shown here, although this table should only be used for conservative pollutants.

5.3.5 Allowable Headworks Loadings Based on Anaerobic Digester Inhibition (Non-Conservative Pollutants) – Table 12

In order to "activate" this table, the user must indicate that an anaerobic digester unit is present at the treatment plant by entering an "X" in the appropriate cell in Table 1. Once the table is activated, available inhibition criteria for cyanide and ammonia are shown in the

"Anaerobic Digester Inhibition Level" column. These criteria are from EPA's local limits guidance. Where a range of values is provided in the EPA guidance, the worksheet uses the lowest value in the range to provide the most protection against inhibition. If no inhibition criterion is provided in EPA's guidance for a given pollutant, the cell is available for a user entered inhibition criterion. However, in order to revise an inhibition value that is built into the table, the worksheet must be unprotected (see Section 2.2) and the value manually entered. If this is done, the values originally provided in the table are overwritten and lost. Note that Table 13 of the worksheet provides an opportunity to enter higher inhibition levels if appropriate. Appropriate inhibition criteria for any pollutants manually added to the spreadsheet must be entered by the user in the "Activated Sludge Inhibition Level" column if available. If the "Anaerobic Digester Inhibition Level" column is left blank for any pollutant, an allowable headworks loading based on anaerobic digester inhibition is not calculated for that pollutant.

The value in the "POTW Flow" column is taken from Table 2 (Table 2b in the Pennsylvania version), the values for the "Average Influent Concentration" column are taken from the 'Monitoring Data' worksheet ("In" column), the values for the "Digester Pollutant Concentration" column are taken from the 'Influent Removals' worksheet ("Inf to Anaerob Dig" column), and the values in the "Average Influent Load" column are calculated using the values from the "POTW Flow" and the "Average Influent Concentration" columns. None of these values are directly entered in this table by the user. Since Table 12 addresses only non-conservative pollutants, no conservative pollutants are originally listed in this table. However, any pollutants added in Table 3 will be shown here, although this table should only be used for non-conservative pollutants. Note that EPA guidance indicates that the maximum allowable headworks loading for BOD_5 and total suspended solids should be based on the treatment plant design loading and therefore these cells are colored grey indicating that allowable headworks loading calculations for these pollutants are not intended to be included in this table. However, if the appropriate information is entered in these cells the worksheet will perform the inhibition calculations for these pollutants as well. Although the cells for ammonia and total nitrogen are not shaded grey, this same approach is intended for these pollutants if the treatment plant is designed to treat for ammonia and/or total nitrogen. Other pollutants for which the treatment plant is designed should be handled in this same manner and no allowable headworks calculation based on inhibition performed.

5.3.6 Comparison of Allowable Headworks Loadings Based on Inhibition – Table 13

The values in the "Allowable Headworks Loading (ACT. SLUDGE)" column are taken from Table 8, the values in the "Allowable Headworks Loading (TRICK. FILTER)" column are taken from Table 9, the values in the "Allowable Headworks Loading (NITRIF)" column are taken from Table 10, the values in the "Allowable Headworks Loading (DIG. – CONSERV.)" column are taken from Table 11, and the values in the "Allowable Headworks Loading (DIG. – NON-CONS.)" column are taken from Table 12. The lowest value from each of these columns for each pollutant is selected and entered in the "Most Stringent (INHIBITION)" column. None of these values are entered directly in this table.

Before finalizing the allowable headworks loadings based on inhibition, the worksheet is designed to perform an additional evaluation. Above Table 13 the worksheet provides an opportunity for the user to specify whether or not inhibition has occurred at the treatment plant. Place an "X" in the cell below "Yes" if the POTW has experienced inhibition within the time frame of the monitoring data in the 'Monitoring Data' worksheet. If no inhibition has been experienced at the POTW during this time frame, place an "X" in the cell below "No". If the user does not specify that inhibition has occurred, Table 13 will assume that no inhibition has occurred. If no inhibition has occurred, Table 13 will compare the value in the "Maximum Influent Loading" column to the value in the "Most Stringent (INHIBITION)" column, and choose the higher of the two values as the allowable headworks loading based on inhibition. This is based on the assumption that the allowable headworks loading based on inhibition should be no lower than a pollutant level previously accepted without inhibition.

The values in the "Monitoring Data Maximum Influent Concentration" column are taken from the 'Monitoring Data' worksheet ("Maximum" row in "In" column). The values in the "Other Maximum Influent Concentration" column are user entered and are intended to allow for consideration of higher influent pollutant levels from a sample result that was eliminated from the data set in the 'Monitoring Data' worksheet or from a time outside of the time frame used in the 'Monitoring Data' worksheet if no inhibition occurred at that time. The value for each pollutant in the "Maximum Influent Loading" column is calculated based on the POTW flow from Table 2 (Table 2b in the Pennsylvania version) and the higher of the two values in the "Monitoring Data Maximum Influent Concentration" column and the "Other Maximum Influent Concentration" column for that pollutant. Unless the user has indicated that inhibition has occurred, the value listed in the "Allowable Headworks Loading (INHIBITION)" column is the higher of the values listed in the "Most Stringent (INHIBITION)" column and the "Maximum Influent Loading" column. If the user indicated that inhibition has occurred, the value listed in the "Allowable Headworks Loading (INHIBITION)" column is set equal to the value in the "Most Stringent (INHIBITION)" column. If the allowable headworks loading for a pollutant is based on the influent loading, the value listed in the "Allowable Headworks Loading (INHIBITION)" column for that pollutant will be highlighted in red bold print.

5.4 Allowable Headworks Loadings Based on Sludge Disposal

Tables 14 through 16 of the worksheet calculate the allowable headworks loading for each pollutant based on sludge disposal. Table 14 calculates the allowable headworks loading for each pollutant based on land application of sludge, Table 15 calculates the allowable headworks loading for each pollutant based on incineration of sludge, and Table 16 selects the most stringent of these allowable headworks loadings as the allowable headworks loading based on sludge for each pollutant. In addition, if the POTW is receiving hauled waste that will not be regulated through the local limits directly to the sludge processing units, Table 16 will adjust the allowable headworks loading based on sludge protection to account for this extra loading.

5.4.1 Allowable Headworks Loadings Based on Land Application Sludge Disposal – Table 14

The value for the "POTW Flow" column and the "Sludge Flow to Disposal" column are taken from Table 2 (Table 2b in the Pennsylvania Version), and the values in the "Removal Efficiency" column are taken from Table 3. None of these values are directly entered in this table. The cells in the "Land Application Standard" column are open for data entry, although the exceptional quality standards for land application from Table 3 of 40 CFR 503.13 (ceiling concentration standard from Table 1 for molybdenum) have been previously entered in this column. Even where the POTW does not land apply its sludge, EPA recommends that the exceptional quality standards be used in the calculation of allowable headworks loadings for sludge disposal by all POTWs as a way of achieving the objective of improving the opportunity to recycle and reclaim municipal sludges[4]. However, since these cells are open for data entry, the user can revise these values without unprotecting the worksheet. If any of the "POTW Flow", "Sludge Flow to Disposal", "Land Application Standard", or "Removal Efficiency" columns is left blank for a pollutant or a zero is entered in the "Removal Efficiency" column no allowable headworks loading based on land application of sludge will be calculated for that pollutant.

5.4.2 Allowable Headworks Loadings Based on Incineration Sludge Disposal – Table 15

In order to "activate" this table, the user must indicate that a sludge incineration unit is present at the treatment plant by entering an "X" in the appropriate cell in Table 1. Once the table is activated, available criteria for the standard 15 pollutants, total phosphorus, total nitrogen, and beryllium are shown in either the "Risk Specific Concentration" column (for arsenic, cadmium, and nickel), the "National Ambient Air Quality Standard" column (for lead), or the "National Emission Standard" column (for mercury and beryllium). The source of these criteria is indicated in the notes shown below the table in the worksheet. The cell for the value for the "Risk Specific Concentration" column for chromium is left open as a user entered value because the value varies based on the type of incinerator present at the POTW. The user should enter the appropriate value from 40 CFR 503.43, Table 2. All other cells in these three columns are colored grey because there are currently no incineration standards available. Note that Table 15 is designed only to calculate allowable headworks loadings based on the criteria listed above and is not designed to calculate allowable headworks loadings for any additional user entered values that may be added in the grey colored cells in any of these three columns. The grey colored cells in these three columns are protected and values cannot be entered without unprotecting the worksheet.

The values for the "Sludge Flow to Incineration" column, the "POTW Flow" column, and the "Sludge Flow to Disposal" column are taken from Table 2 (Table 2b in the Pennsylvania version). The values for the "Removal Efficiency" column are taken from the "Removal Efficiency" column in Table 3 (overall removal efficiency). None of these values are directly

[4] The objectives of the pretreatment program are listed in 40 CFR 403.2.

entered in this table. The value for the "Incinerator Dispersion Factor" column is entered manually for arsenic (cell C731) and then is copied to the cells for all other pollutants in this column. The values for the "Incinerator Control Efficiency" column are user entered while the values in the "Incineration Standard" column are calculated[5].

5.4.3 Comparison of Allowable Headworks Loadings Based on Sludge Disposal – Table 16

The values in the "Allowable Headworks Loading (LAND APPL.)" column are taken from Table 14, and the values in the "Allowable Headworks Loading (INCINERATION)" column are taken from Table 15. The values in the "Hauled Waste Concentration to Sludge Processing" column are taken from the "Average" row in the 'Monitoring Data' worksheet in the "Hauled to Sludge" column. The value in the "Hauled Waste Flow to Sludge Processing" column is taken from Table 2 (Table 2b in the Pennsylvania Version). The values in the "Hauled Waste Loading to Sludge Processing" column are calculated based on the values in the "Hauled Waste Concentration to Sludge Processing" column and the "Hauled Waste Flow to Sludge Processing" column. None of these values are entered directly in this table.

Before finalizing the allowable headworks loadings based on sludge disposal, the worksheet will perform an additional calculation. If the POTW is receiving hauled waste directly to the sludge processing units that will not be regulated through the local limits, Table 16 will adjust the allowable headworks loading based on sludge protection to account for this extra loading. Since wastes discharged directly to the sludge processing units have limited if any impact on the POTW effluent or the potential for inhibition, the loading from these wastes is only addressed as part of the sludge disposal calculations. To calculate the allowable headworks loadings based on sludge disposal for each pollutant, Table 16 first selects the lower of the two values in the "Allowable Headworks Loading (LAND APPL.)" column and the "Allowable Headworks Loading (INCINERATION)" column. The value in the "Hauled Waste Loading to Sludge Processing" column is then subtracted from the resulting value to determine the allowable headworks loading based on sludge disposal.

5.5 Comparison of Allowable Headworks Loadings – Table 17

The values in the "Allowable Headworks Loading (WATER QUALITY)" column are taken from Table 7, the values in the "Allowable Headworks Loading (INHIBITION)" column are taken from Table 13, and the values in the "Allowable Headworks Loading (SLUDGE)" column are taken from Table 16. None of these values are entered directly in this table. The values in the "Design Loading" column are user entered. The design loading cells for the metals and cyanide are colored grey since it is not expected that the POTW will be designed to treat these pollutants. However, these cells are open for data entry if necessary. For each pollutant, the value in the "Maximum Allowable Headworks Loading" column is the lowest of the values for that pollutant from the "Allowable Headworks Loading (WATER QUALITY)" column, the

[5] See Appendix T of EPA's local limits guidance for the formulas used in these calculations.

"Allowable Headworks Loading (INHIBITION)" column, the "Allowable Headworks Loading (SLUDGE)" column, and the "Design Loading" column.

5.6 Calculation of Local Limit – Table 18

The values in the "Maximum Allowable Headworks" column are taken from Table 17. The values in the "Nonindustrial Concentration" column and the "Hauled Waste to Influent Concentration" column are taken from the average values in the appropriate column in the 'Monitoring Data' worksheet. The value in the "Nonindustrial Flow" column is calculated based on the values for "POTW Flow", "IU Flow", and "Hauled Waste Flow to Influent" entered in Table 2 (Table 2b in the Pennsylvania version), and the value in the "Hauled Waste Flow to Influent" column is taken from Table 2 (Table 2b in the Pennsylvania version). The values in the "Nonindustrial Loading" column are calculated based on the values in the "Nonindustrial Concentration" column and the "Nonindustrial Flow" column, while the values in the "Hauled Waste to Influent Loading" column are calculated based on the values in the "Hauled Waste to Influent Concentration" column and the "Hauled Waste to Influent Flow" column. The values in the "Allowable Industrial Loading" column are calculated based on the values in the "Maximum Allowable Headworks" column, the "Safety Factor" column, the "Growth Allowance" column, the "Nonindustrial Loading" column, and the "Hauled Waste to Influent Loading" column. The values in the "Calculated Local Limit" column are calculated based on the values in the "Allowable Industrial Loading" column and the "IU Flow" from Table 2 (Table 2b in the Pennsylvania version). The values in the "Calculated Local Limit" column would be the uniform concentration local limits. None of these values are user entered. The values in the "Safety Factor" column and the "Growth Allowance" column are user entered. Note that these values must be entered as percentages rather than decimals. If a value of less than 10 is entered for a pollutant in either of these columns, the value will be shown in red bold print. EPA guidance recommends that the safety factor and growth factor be greater than 10%.

After calculation of the local limit for each pollutant, the "Basis of Limitation" column will display 'Water Quality' if the maximum allowable headworks loading is based on the allowable headworks loading for water quality, will display 'Inhibition' if the maximum allowable headworks loading is based on the allowable headworks loading for inhibition, will display 'Sludge' if the maximum allowable headworks loading is based on the allowable headworks loading for sludge disposal, and will display 'Design' if the maximum allowable headworks loading is based on the treatment plant design loading.

5.7 Comparison of Existing and Calculated Local Limits – Table 19

Table 19 of the worksheet compares the POTW's existing local limits with the calculated and proposed local limits and highlights several potential issues. The values in the "Calculated Allowable Industrial Loading" column and the "Calculated Uniform Concentration Limit" column are taken from Table 18. The values in the "Existing Allowable Industrial Loading" column and the "Existing Local Limit" column are user entered and should be based on the POTW's previously approved local limits. The values in the "Proposed Local Limit" column are

user entered and should be the limits that the POTW is proposing to adopt based on the current local limits reevaluation. If the value for a pollutant in the "Calculated Allowable Industrial Loading" column is lower than the value for the same pollutant in the "Existing Allowable Industrial Loading" column, or if there is no value in the "Existing Allowable Industrial Loading" column, then the value in the "Calculated Allowable Industrial Loading" column will be highlighted in green bold print. If the value for a pollutant in the "Calculated Allowable Industrial Loading" column is higher than the value for the same pollutant in the "Existing Allowable Industrial Loading" column, then the value in the "Calculated Allowable Industrial Loading" column will be highlighted in brown bold print. Likewise, if the value for a pollutant in the "Calculated Uniform Concentration Limit" column is lower than the value for the same pollutant in the "Existing Local Limit" column, or if there is no value in the "Existing Local Limit" column, then the value in the "Calculated Uniform Concentration Limit" column will be highlighted in green bold print. If the value for a pollutant in the "Calculated Uniform Concentration Limit" column is higher than the value for the same pollutant in the "Existing Local Limit" column, then the value in the "Calculated Uniform Concentration Limit" column will be highlighted in brown bold print.

Table 19 will also determine if the proposed local limit is less stringent than the calculated local limit. To do this, the user should first indicate whether the POTW is proposing uniform concentration limits for approval or the POTW is proposing approval of the maximum allowable industrial loading for allocation through the user permits. In the boxes above the table, place an "X" in the cell below "POTW Adopting Uniform Concentration" if the POTW is proposing uniform concentration limits for approval. If the POTW is proposing approval of the maximum allowable industrial loading, place an "X" in the cell below "POTW Adopting MAIL". Do not select both cells. When the "X" is placed in the cell below "POTW Adopting MAIL" the units listed in the "Proposed Local Limit" column will change from "mg/l" to "lbs/d". The value for a pollutant in the "Proposed Local Limit" column will then be compared to the value for the same pollutant in the "Calculated Allowable Industrial Loading" column. If the value for the pollutant in the "Proposed Local Limit" column is greater than the value for the same pollutant in the "Calculated Allowable Industrial Loading" column the value in the "Proposed Local Limit" column will be highlighted in red bold print. This indicates that the POTW is proposing a limit that is less stringent than the limits evaluation suggests is necessary. When the "X" is placed in the cell below "POTW Adopting Uniform Concentration" the units listed in the "Proposed Local Limit" column will stay as "mg/l", and the value for a pollutant in the "Proposed Local Limit" column will be compared to the value for the same pollutant in the "Calculated Uniform Concentration Limit" column. If the value for the pollutant in the "Proposed Local Limit" column is greater than the value for the same pollutant in the "Calculated Uniform Concentration Limit" column the value in the "Proposed Local Limit" column will be highlighted in red bold print. Again, this indicates that the POTW is proposing a limit that is less stringent than the limits evaluation suggests is necessary. In most cases, a proposed limit that is less stringent than the calculated limit will not be acceptable. However, the red bold highlighting of the proposed limit will occur even if the difference between the existing and proposed limits is only based on rounding of the proposed limit. If the difference between the existing and proposed limits is only based on the rounding of the proposed limit then the proposed limit may be acceptable. There may be additional reasons that a red bold highlighted

proposed limit may be acceptable, but the user should be prepared to explain why it is proposing a limit that is higher than the calculated limit.

Table 19 will also highlight two other issues. If the user selects "POTW Adopting Uniform Concentration" and the value in the "Proposed Local Limit" column is greater than the value in the "Existing Local Limit" column, the "Other Issues?" column will indicate "EPA Public Notice". If the user selects "POTW Adopting MAIL" and the value in the "Proposed Local Limit" column is greater than the value in the "Existing Allowable Industrial Loading" column, the "Other Issues?" column will also indicate "EPA Public Notice". If any of the pollutants show "EPA Public Notice" it is an indication that EPA may be required to conduct a public notice and comment period prior to formal approval of the limits.

In addition, if no value is entered for a pollutant in the "Proposed Local Limit" column and a value is entered in the "Existing Local Limit" column for the same pollutant the "Other Issues?" column will indicate "Need Limit?" "Need Limit?" will also be displayed in the "Other Issues" column if no value is entered in the "Proposed Local Limit" column for a pollutant and either the value in the "Average Percent Loaded" column in Table 20 is greater than 60% (80% for ammonia, BOD_5, total suspended solids, total phosphorus, and total nitrogen if the maximum allowable headworks loading is based on the treatment plant design loading) or the value in the "Maximum Percent Loaded" column in Table 20 is greater than 80% (100% for ammonia, BOD_5, total suspended solids, total phosphorus, and total nitrogen if the maximum allowable headworks loading is based on the treatment plant design loading). EPA guidance suggests that the POTW may need a local limit in any of these situations. Where "Need Limit?" is displayed in the "Other Issues?" column, an "X" will be displayed in the appropriate column(s) under "Basis of "Need Limit?"". Where "Need Limit?" is shown in the "Other Issues?" column and the POTW believes that a local limit is not needed, justification will need to be provided in the local limits submission.

5.8 Comparison of Allowable Headworks Loadings and Current Influent Loadings – Table 20

This table compares the calculated maximum allowable headworks loading to the current influent loadings based on the sample results entered in the 'Monitoring Data' worksheet. The values in the "Maximum Allowable Headworks Loading" column are taken from Table 17. The values in the "Average Influent Loading" column are taken from the influent loading cell for that pollutant in the 'Monitoring Data' worksheet. The values in the "Maximum Influent Loading" column are calculated based on the maximum influent concentration for that pollutant shown in the 'Monitoring Data' worksheet and the POTW flow shown in Table 2 (Table 2b in the Pennsylvania version). The values in the "Average Percent Loaded" column and the "Maximum Percent Loaded" column are calculated using the values in the "Average Influent Loading" and "Maximum Influent Loading" columns respectively and the values in the "Maximum Allowable Headworks Loading" column. None of the values listed in the table are user entered.

Other than for ammonia, BOD_5, total suspended solids, total phosphorus, and total nitrogen, any value listed in the "Average Percent Loaded" column that is greater than 60 and

any value listed in the "Maximum Percent Loaded" column that is greater than 80 will be highlighted in green bold print. EPA guidance suggests that if no local limit exists for one or more of these pollutants, a new limit should be established. Any value in either of these columns that is greater than 100 will be highlighted in red bold print. This indicates that the POTW may need to reduce the level of that pollutant that is entering the treatment plant. For ammonia, BOD_5, total suspended solids, total phosphorus, and total nitrogen any value listed in the "Average Percent Loaded" column that is greater than 80 will be highlighted in green bold print and any value in either of these columns that is greater than 100 will be highlighted in red bold print.

5.9 Calculation of Influent, Effluent, and Sludge Goals – Table 21

The influent, effluent, and sludge goals are the values that, based on the local limits evaluation, should be met at the influent, effluent, and sludge sampling points in order to prevent pass through and interference. The influent goal is the theoretical pollutant level that must be met at the influent sample point in order to meet the effluent and sludge disposal requirements and to prevent inhibition. If the influent, effluent, and/or sludge goals are exceeded it is an indication of a potential problem that may need to be addressed. Exceedances of the influent goal without exceedances of the effluent and sludge goals and no occurrence of inhibition at the treatment plant suggests that the influent goal, and therefore the maximum allowable headworks loading and calculated local limit, may be too low. Exceedances of the effluent and/or sludge goals or occurrences of inhibition with no exceedances of the influent goal suggest that the influent goal, and therefore the maximum allowable headworks loading and the calculated local limit, may be too high. Exceedances of the influent goal together with exceedances of the effluent and/or sludge goals or occurrences of inhibition suggest that the levels of that pollutant into the treatment plant need to be reduced. If monitoring data shows that all of the users are in compliance with the calculated local limits, this suggests that the local limit may need to be reduced or that users that are currently not regulated may need to be regulated under the POTW's pretreatment program.

The values in the "Maximum Allowable Headworks Loading" column are taken from Table 18. The value in the "POTW Flow" column is taken from Table 2 (Table 2b in the Pennsylvania version). The values in the "Influent Goal" column are calculated by converting the values in the "Maximum Allowable Headworks Loading" column to a concentration using the POTW flow. The values in the "Allowable Headworks Loading (WATER QUALITY)" column are taken from Table 7 and the values in the "Removal Efficiency" column are taken from Table 3. The values in the "Effluent Goal" column are calculated using the values in the "Allowable Headworks Loading (WATER QUALITY)" column, the values in the "Removal Efficiency" column, and the POTW flow. The values in the "Allowable Headworks Loading (SLUDGE)" column are taken from Table 16 and the value in the "Sludge Flow to Disposal" column is taken from Table 2 (Table 2b in the Pennsylvania version). The values in the "Sludge Goal" column are calculated using the values in the "Allowable Headworks Loading (SLUDGE)" column, the values in the "Sludge Flow to Disposal" column, and the values in the "Removal Efficiency" column. None of the values in this table are user entered.

5.10 Comparison of Influent, Effluent, and Sludge Goals to Monitoring Data – Table 22

Table 22 uses the sampling data in the 'Monitoring Data' worksheet to determine if any of the influent, effluent, or sludge goals have been exceeded. The values in the "Influent Goal" column, the "Effluent Goal" column, and the "Sludge Goal" column are taken from Table 21. The values in the "Number of Influent Measurements" column, the "Number of Effluent Measurements" column, and the "Number of Sludge Measurements" column, are taken from the appropriate cell in the "Count" row of the 'Monitoring Data' worksheet. The values in the "Number of Influent Exceedances" column, the "Number of Effluent Exceedances" column, and the "Number of Sludge Exceedances" column are calculated based on a comparison of the sampling data listed in the 'Monitoring Data' worksheet for each location (i.e., influent, effluent, and sludge) to the goal for that location. The spreadsheet counts each sample result listed in the 'Monitoring Data' worksheet for the location that is greater than the goal for that location and the total is displayed in the "Number of Exceedances" column. "OK" is shown in the "Influent Evaluation" column, the "Effluent Evaluation" column, and the "Sludge Evaluation" column if there are no exceedances for that location, "?" is shown if the number of exceedances is greater than zero and less than or equal to 25% of the total number of measurements for that location, "!!" is shown if the number of exceedances is greater than 25% of the total number of measurements for that location and less than or equal to 50% of the total number of measurements for that location, "!!!!" is shown if the number of exceedances is greater than 50% of the total number of measurements for that location and less than or equal to 75% of the total number of measurements for that location, and "!!!!!!" is shown if the number of exceedances is greater than 75% of the total number of measurements for that location. In addition, whenever there is at least one exceedance for a given location, the values in the "Number of Measurements" column, the "Number of Exceedances" column, and the "Evaluation" column are highlighted in red bold. Note that this evaluation does not consider any data that was eliminated in the 'Monitoring Data' worksheet. None of the values in this table are user entered.

Based on the evaluation in Table 22, it may be possible to make some assessments regarding the appropriateness of the calculated local limits. Based on the calculations, the influent goal represents the influent pollutant level necessary to prevent exceedances of the effluent requirements (NPDES limits and water quality standards), to prevent exceedances of the sludge disposal requirements (criteria used in the sludge allowable headworks loading calculations), and to prevent inhibition. Therefore, if the influent pollutant levels are consistently below the influent goals, then the effluent levels should be consistently below the effluent goals, the sludge levels should be consistently below the sludge goals, and there should be no inhibition occurring at the treatment plant. If the measured influent levels for a pollutant exceed the influent goal, but there are no effluent or sludge exceedances and no inhibition, then the influent goal is likely lower than necessary to protect the treatment plant. Since the influent goal is based on the maximum allowable headworks loading which is the basis for the local limit, it may also mean that the calculated local limit is more stringent than necessary and the user should reevaluate some of the assumptions made during the local limits development process. Likewise, if the influent goal is not exceeded but there are exceedances of the effluent or sludge goals or inhibition has been occurring, then the influent goal is likely higher than necessary and the calculated local limit for that pollutant is likely not stringent enough. Again, if this situation

arises the user should reevaluate assumptions made during the local limits development process. The table below summarizes the four main scenarios based on the influent, effluent, and sludge evaluation for a pollutant conducted in Table 22 of the 'Limits Calculation' worksheet.

IF:	AND:	THEN:
Influent level is greater than influent goal	Effluent or sludge level is greater than goal or inhibition has occurred	Influent goal and therefore local limit appears to be appropriate; investigate causes of and reduce high influent level of the pollutant
Influent level is greater than influent goal	Effluent and sludge level is less than goal and no inhibition has occurred	Influent goal and therefore local limit appears to be too low; reevaluate assumptions made during evaluation
Influent level is less than influent goal	Effluent or sludge level is greater than goal or inhibition has occurred	Influent goal and therefore local limit appears to be too high; reevaluate assumptions made during evaluation; investigate causes of and reduce influent level of the pollutant to reduce effluent or sludge levels and prevent inhibition
Influent level is less than influent goal	Effluent and sludge level is less than goal and no inhibition has occurred	Influent goal and therefore local limit appears to be appropriate; continue to monitor pollutant levels

5.11 Printing the Limits Calculation Worksheet

The spreadsheet default for the 'Limits Calculation' worksheet is set to print each table on a single page of 8½ X 14 paper, except that Tables 1 and 2 (Tables 1, 2a and 2b in the Pennsylvania version) will print on one page. The print area for the worksheet is set so that the widest table will print on a single page. The worksheet is also set to print double sided, although this may depend on the user's printer settings. Because of the highlighting that is used in some of the tables it is recommended that this worksheet be printed in color.

Where more than 21 additional pollutants have been added to the worksheet, the page breaks previously set in the worksheet may need to be revised prior to printing. In order to see the page breaks set in the worksheet, change to the "Page Break Preview" view by selecting the "View" tab and then clicking on "Page Break Preview" in the "Workbook Views" box. In this view, page breaks will be shown as a solid or dashed blue line. If a page break (blue line shown in the "Page Break Preview" view) falls in the middle of table, the page break can be adjusted by moving the cursor over the blue line, left clicking, and dragging the line up or down. Once the page breaks are set, the worksheet can be printed.

6.0 CHANGES FROM PREVIOUS VERSIONS OF THE SPREADSHEET

Changes to the local limits spreadsheet have only been tracked starting with the change from Version 4.0 to Version 5.0. A summary of these changes is provided below.

6.1 Changes From Version 4.0 to Version 5.0

- Changes were made to allow calculation of removal rates for use in the inhibition calculations. The 'Inhibition Removals' worksheet was added and the 'Limits Calculation' worksheet was revised to allow for selection of the removals in this worksheet in Tables 8 through 10. In addition, the digester pollutant concentration in Table 12 of the 'Limits Calculation' worksheet is now taken from "Inf to Anaerob Dig" column for the appropriate pollutant in the 'Inhibition Removals' worksheet.
- Changes were made to the evaluation of the need for a local limit in Table 19. For ammonia, BOD_5, total suspended solids, total phosphorus, and total ammonia the "Other Issues?" column will now show "Need Limit?" if the maximum allowable headworks loading for these pollutants is based on the treatment plant design loading and the "Average Percent Loaded" column in Table 20 is more than 80% or the "Maximum Percent Loaded" column in Table 20 is greater than 100%. Where the maximum allowable headworks loading for any of these pollutants is based on something other than the treatment plant design loading the "Other Issues?" column will show "Need Limit?" if the "Average Percent Loaded" column in Table 20 is more than 60% or the "Maximum Percent Loaded" column in Table 20 is greater than 80%.
- Changes were made in the use of the partial mix factors in the Pennsylvania version of the spreadsheet. Rather than calculate the partial mix factors from the complete mix time, the partial mix factors are entered directly. In addition, rather than using an "other" partial mix factor for all standards calculations other than the acute standards, a chronic partial mix factor is used for determining the stream flow for use with chronic water quality standards and a cancer risk level partial mix factor is used for determining the stream flow for use with cancer risk level water quality standards. The acute partial mix factor is still used for determining the stream flow for use with acute water quality standards.
- Changes were made in the Pennsylvania version of the spreadsheet to allow use of the receiving stream flow at the nearest downstream drinking water intake for standards that are based on public water supply use (e.g., total dissolved solids).

6.2 Changes From Version 5.0 to Version 5.1

- Table 13 of Version 5.0 did not select the most stringent allowable headworks loading based on inhibition if calculations for trickling filter inhibition were the only inhibition calculations completed for that pollutant. If other inhibition calculations (e.g., activated sludge) were completed for the pollutant in addition to

the trickling filter inhibition calculations, the correct allowable headworks loading was selected. This error has been corrected in Version 5.1.